

## WHAT IS CLAIMED IS:

1. A method of logically erasing contents of a CD-RW disc in response to an erase command, the CD-RW disc being optically rewriteable and having a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing identification information for identifying the CD-RW disc and the other kind of frames containing track information for indicating the tracks of the contents recorded in the program area, the method comprising the steps of:

accessing to the PMA area in response to the erase command;

deleting all of frames containing the track information from the PMA area, thereby logically erasing all of the contents from the program area; and

reserving frames containing the identification information in the PMA area, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

2. The method according to claim 1, wherein the step of reserving comprises reserving frames containing the identification information at a predetermined leading section

of the PMA area.

3. The method according to claim 1, wherein the PMA area is divided into sections by every ten number of frames, and wherein the step of reserving comprises reserving a ten number of frames which contain the identification information into a predetermined section of the PMA area so as to fill the predetermined section.

4. The method according to claim 1, further comprising the step of deleting the frames containing the identification information instead of the step of reserving the frames containing the identification information when the identification information is ineffective.

5. The method according to claim 1, wherein the step of reserving comprises detecting when the identification information is composed of an ineffective code, and then rewriting the identification information from the ineffective code to an effective code.

6. A method of logically erasing contents of a CD-RW disc in response to an erase command, the CD-RW disc being optically rewriteable and having a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least

two kinds of frames, one kind of frames containing identification information for identifying the CD-RW disc and the other kind of frames containing track information for indicating the tracks of the contents recorded in the program area, the method comprising the steps of:

accessing to the PMA area in response to the erase command;

detecting when the frames containing the identification information are located at a leading section of the PMA area and the frames containing the track information are located in a subsequent section of the PMA area after the leading section; then

deleting all of the frames which contain the track information from the PMA area, thereby logically erasing all of the contents from the program area; and

reserving the frames which contain the identification information as they are at the leading section of the PMA area, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

7. The method according to claim 6, wherein the PMA area is divided into sections by every ten number of frames, and wherein the step of reserving comprises reserving a ten number of frames which contain the identification information in the leading section of the PMA area.

9. The method according to claim 6, wherein the step of reserving comprises detecting when the identification information is composed of an ineffective code, and then rewriting the identification information from the ineffective code to an effective code.

10. A method of logically erasing contents of a CD-RW disc in response to an erase command, the CD-RW disc being optically rewriteable and having a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing identification information for identifying the CD-RW disc and the other kind of frames containing track information for indicating the tracks of the contents recorded in the program area, the method comprising the steps of:

accessing to the PMA area in response to the erase  
command;

detecting when first frames/containing the

identification information are located at a part of a leading section of the PMA area and when second frames containing the track information are located after the first frames in the PMA area; then

deleting all of the second frames so as to logically erase all of the contents from the program area; and

reserving the first frames in the leading section of the PMA area while filling the leading section by the first frames to complete the leading section, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

11. The method according to claim 10, wherein the PMA area is divided into sections by every ten number of frames, and wherein the step of reserving comprises reserving a ten number of frames which contain the identification information into the leading section of the PMA area so as to fill the leading section.

12. The method according to claim 10, further comprising the step of deleting the frames containing the identification information instead of the step of reserving the frames containing the identification information when the identification information is ineffective.

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detecting when first frames containing the identification information are located at a subsequent section of the PMA area and when second frames containing the track information are located in either of the leading section and the subsequent sections except for that containing the first frames; then

deleting all of the second frames so as to logically

reserving the first frames in the leading section of the PMA area by copying the first frames from the subsequent section while deleting the first frames from the subsequent section, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

16. The method according to claim 14, further comprising the step of deleting the frames containing the identification information instead of the step of reserving the frames containing the identification information when the identification information is ineffective.

17. The method according to claim 14, wherein the step of reserving comprises detecting when the identification information is composed of an ineffective code, and then rewriting the identification information from the ineffective code to an effective code.

18. A method of logically erasing contents of a CD-RW disc having a program area and a PMA area in response to an erase command, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing track information for indicating the tracks of the contents recorded in the program area and the other kind of frames containing identification information for identifying the CD-RW disc, the method comprising the steps of:

accessing to the PMA area in response to the erase command effective to command an erase of the last track from the program area;

detecting when frames containing the identification information are located at a succeeding section of the PMA area after a preceding section of the PMA area containing frames corresponding to the last track; then

deleting the frames corresponding to the last track from the preceding section so as to logically erase the contents of the last track from the program area; and

reserving the frames containing the identification information in the preceding section of the PMA area by copying the frames containing the identification information from the succeeding section while deleting the frames containing the identification information from the succeeding section.



19. The method according to claim 18, wherein the PMA area is divided into sections by every ten number of frames, and wherein the step of reserving comprises reserving a ten number of frames which contain the identification information into the preceding section of the PMA area so as to fill the preceding section.

20. The method according to claim 18, further comprising the step of deleting the frames containing the identification information instead of the step of reserving the frames containing the identification information when the identification information is ineffective.

21. The method according to claim 18, wherein the step of reserving comprises detecting when the identification information is composed of an ineffective code, and then rewriting the identification information from the ineffective code to an effective code.

22. A method of logically erasing contents of a CD-RW disc having a program area and a PMA area in response to an erase command, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing track information for indicating the tracks of the contents

23. The method according to claim 22, further comprising the step of deleting the frames containing the identification information instead of the step of reserving the frames containing the identification information when the identification information is ineffective.

24. The method according to claim 22, wherein the step of reserving comprises detecting when the identification information is composed of an ineffective code, and then rewriting the identification information from the ineffective code to an effective code.

25. A method of logically erasing contents of a CD-RW disc having a program area and a PMA area in response to an erase command, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing track information for indicating the tracks of the contents recorded in the program area and the other kind of frames containing identification information for identifying the CD-RW disc, the PMA area being divided into sections by every ten number of frames, the method comprising the steps of:

accessing to the PMA area in response to the erase command effective to command an erase of the last track from the program area;

detecting when a five number of frames corresponding to the last track are located in a preceding section and another five number of frames corresponding to a track next to the last track are located in the same preceding section, and a ten number of frames containing the identification information are located at a succeeding section of the PMA area after the preceding section; then

a mount that mounts a CD-RW disc which is optically

rewriteable and which has a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing identification information for identifying the CD-RW disc and the other kind of frames containing track information for indicating the tracks of the contents recorded in the program area;

an input that inputs an erase command effective to logically erase all of the contents from the program area of the CD-RW disc;

a pickup that accesses to the PMA area of the mounted CD-RW disc in response to the erase command; and

a controller that controls the pickup to delete all of frames which contain the track information from the PMA area, thereby logically erasing all of the contents from the program area, and that controls the pickup to reserve frames which contain the identification information in the PMA area, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

29. An apparatus for logically erasing contents of a CD-RW disc, comprising:

a mount that mounts the CD-RW disc having a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded

an input that inputs an erase command effective to  
command an erase of the last track from the program area;

a controller that controls the pickup to perform a process comprising the steps of:

deleting the frames corresponding to the last track from the preceding section so as to logically erase the contents of the last track from the program area; and

30. A machine readable medium for use in an apparatus having

a processor for logically erasing contents of a CD-RW disc in response to an erase command, the CD-RW disc being optically rewriteable and having a program area and a PMA area, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing identification information for identifying the CD-RW disc and the other kind of frames containing track information for indicating the tracks of the contents recorded in the program area, wherein the medium containing program instructions executable by the processor for causing the apparatus to perform a method comprising the steps of:

accessing to the PMA area in response to the erase command;

deleting all of frames containing the track information from the PMA area, thereby logically erasing all of the contents from the program area; and

reserving frames which contain the identification information in the PMA area, so that the CD-RW disc can be identified at rewriting thereof even after all of the contents are logically erased from the program area of the CD-RW disc.

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31. A machine readable medium for use in an apparatus having a processor for logically erasing contents of a CD-RW disc having a program area and a PMA area in response to an erase

command, the program area being recorded with the contents in the form of tracks, the PMA area being recorded with at least two kinds of frames, one kind of frames containing track information for indicating the tracks of the contents recorded in the program area and the other kind of frames containing identification information for identifying the CD-RW disc, wherein the medium containing program instructions executable by the processor for causing the apparatus to perform a method comprising the steps of:

accessing to the PMA area in response to the erase command effective to command an erase of the last track from the program area;

detecting when frames containing the identification information are located at a succeeding section of the PMA area after a preceding section of the PMA area containing frames corresponding to the last track; then

deleting the frames corresponding to the last track from the preceding section so as to logically erase the contents of the last track from the program area; and

reserving the frames containing the identification information in the preceding section of the PMA area by copying the frames containing the identification information from the succeeding section while deleting the frames containing the identification information from the succeeding section.

